REMARKS

This responds to the Office Action mailed on October 23, 2006.

Claims 30-34, 40 and 41 are amended, claims 15-29, 35-39 and 43 are canceled; as a result, claims 1-14, 30-34 and 40-42 are now pending in this application.

§112 Rejection of the Claims

Claims 1-14 and 30-43 were rejected under 35 USC § 112, first paragraph, as failing to comply with the enablement requirement. Applicant respectfully traverses the rejection. The Office asserts the "specification fail to disclose the deposition of the SCC on a board concurrently with the bonding of the mating an electric die to the board." As far as Applicant can understand this sentence, Applicant believes the Office is asserting the deposition is concurrent, i.e. simultaneous with mating. But claim 1 makes no such limitation. Claim 1 states a limitation of "while mating forming a stress-compensation collar (SCC) on the board". These are two different processes, the former of which, Applicant does not believe he teaches, and definitely does not claim in claim 1. Applicant directs the Office to the discussion of FIGs. 1C and 1D, set forth below:

> FIG. 1C is a cross-section elevation of the chip package 101 depicted in FIG. 1B during further processing according to an embodiment. ***The chip package 102 is being mated to a board 126***. Processing depicted in FIG. 1C includes the substrate 114 having been inverted and the substrate 114 and the board 126 are being directed toward each other as indicated by the directional arrows.
> In an embodiment, the board 126 is prepared with ***a plurality of pre-applied stress-compensation collar (SCC) precursor spots***, one of which is designated with the reference numeral 128. The pre-applied SCC precursor spots 128 provide a stress-compensating structure to offset any stresses that are borne in the SRL 124 as stresses are transferred between substrate 114 and board 126.
> In an embodiment, the pre-applied SCC precursor spots 128 include flux that reacts chemically at increasing temperatures to release acids that reduce metal-oxides that are present between the bond pad on the board 126 and the solder first bump 116.
> FIG. 1D is a cross-section elevation of the chip package 102 depicted in FIG. 1C during further processing according to an embodiment. The chip package 103 has been mated by assembling the die 110 and the substrate 114 onto which it is mounted, with the board 126. Assembly ***has been accomplished by pushing the solder first bumps 116 through the pre-applied SCC precursor spots 128*** (FIG. 1C). Thereafter, the stress-compensation collar precursor spots 128 are depicted

> as a stress-compensation collar, one of which is designated as an SCC with the reference numeral 129.

Withdrawal of the rejection is respectfully requested.

Applicant thanks the Examiner for his careful examination of the claims. Consequently, claims 30 to the end have been affected by amendments.

§*102 Rejection of the Claims*

Claims 1-3, 5-10, 30 and 31 were rejected under 35 USC § 102(b) as being anticipated by Imamura et al. (U.S. 2002/0185309). The Applicant respectfully traverses the rejection and requests the Office to consider the following.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." (*Verdegaal Bros. v. Union Oil Co. of California,* 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), M.P.E.P. §2131, 8th Ed., Rev. 4).

Claim 1 requires the "while mating forming a stress-compensation collar (SCC) on the board, wherein the SCC abuts the solder first bump." The Office Action erroneously calls Imamura's item 114 "a flux (114)". But item 114 is a connection terminal. Because the Office refers to a flux (114) at least four times in Office Action, Applicant requests clarification.

The Office states that it is "equating the flux to the stress compensation collar because they are both mad of the same material, i.e. resin flux". (Office Action at page 3). Applicant respectfully disagrees. Applicant is claiming, among other things, a collar structure. Nowhere does Imamura teach a collar structure, let alone one that is calculated to compensate for stress "wherein the SCC abuts the solder first bump." (Claim 1). The Office Action cites to Imamura, but Imamura teaches at paragraph [0095] that

> [s]ubsequently, the washing process is conducted for unremoved flux and unremoved metal grains as shown in GIG. 6D, and the forming process is conducted to form the under fill resin 118 as shown in FIG. 6E.

This is necessary because unremoved metal grains would present an electrical shorting danger. Consequently, Imamura does not form or appreciate the formation of a stress compensation

collar structure while mating a die to a board as required in claim 1. Imamura uses the under fill resin 118, which does not have a collar structure.

The *Response to Arguments* section, in the Office Action states "Imamura still teaches bonding the substrate and forming the SCC." (Office Action at page 6). Applicant has demonstrated that no collar structure is formed, anywhere, in Imamura. Because Imamura does not anticipate claim 1, withdrawal of the rejection is respectfully requested.

The *Response to Arguments* section also states "the examiner cannot find where in the specification [deposition and mating] occur concurrently." (Office Action at page 6). This assertion remains inconclusive to Applicant, because claim 1 does not claim this limitation.

Claims 1 and 4 were also rejected under 35 USC § 102(e) as being anticipated by Wang et al. (U.S. 2003/0096453). The Applicant respectfully traverses the rejection and requests the Office to consider the following.

Wang teaches cleaning away any flux residue in FIG. 1. Further, Wang teaches that any flux is fully chemically incorporated into the underfill material such that any collar structure is destroyed.

> [0027] Illustrated in FIG. 4 is representative of the processes for assembling a chip in accordance with the present invention. The process begins with the application of tacky epoxy flux (403) …. The tacky flux is formulated with compositions compatible with or similar to underfill composition and therefore *will be incorporated into the adhesive network structure after reflow heating cycle*. In this context the word compatible means that the tacky fluxs are composed of chemicals which are reactive to the epoxy or other compositions in underfill material. During reflow heating, the *tacky flux is solublized in the underfill material and become a part of the net work structure* after curing.

(Wang at paragraph [0027]. Emphases added). Consequently, Wang does not form- nor appreciate the formation of a stress compensation collar while mating a die to a board as required in claim 1. Wang uses the cured underfill resin 209, which does not have a collar structure. Because Wang does not anticipate claim 1, withdrawal of the rejection is respectfully requested.

§103 Rejection of the Claims

Claims 11-14 were rejected under 35 USC § 103(a) as being unpatentable over Wang et al. in view of Capote et al. (U.S. 2003/0218261). Applicant respectfully traverses the rejection and requests the Office to consider the following.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (M.P.E.P. § 2143 8th Ed, Rev.4).

The Office Action admits that "Wang et al. fails to teach the stress compensation reduction layer on the bottom of the substrate. (Office Action at page 4). Further as set forth above, Wang does not form nor appreciate the formation of a collar structure on the board while mating are required in claim 1 from which claim 11 depends. Capote does nothing to remedy these deficiencies. Because all the claim limitations are not taught in the cited references, withdrawal of the rejections is respectfully requested.

Claims 35 and 36 were also rejected under 35 USC § 103(a) as being unpatentable over Imamura et al. in view of Ludwig et al. (U.S. 2004/0060963).). Applicant respectfully traverses the rejection and requests the Office to consider the following.

The Office Action invokes Official Notice to supplement what the cited references are admitted to have missing. Official Notice cannot be invoked by fiat. It must be substantiated if challenged, pursuant to M.P.E.P. § 2144.03. Applicant traverses the assertion of Official Notice and requests that the Office cite a reference that teaches the missing element. If the Office cannot cite a reference that teaches the missing element, applicant respectfully requests that the Office provide an affidavit that describes how the missing element is present in the prior art. If

the Office cannot cite a reference or provide an affidavit, Applicant requests withdrawal of the rejections.

The Office Action admits that "Imamura fails to disclose the use of a translational gantry in depositing the flux." (Office Action at page 5). Applicant respectfully objects to the taking of official notice, and In any event, because Imamura does not teach the limitations of claim 30, particularly, because Imamura does not form or appreciate the formation of a stress compensation collar while mating a die to a board as required in claim, all the claim limitations are not taught in the cited references. Withdrawal of the rejections is respectfully requested.

Claims 37-43 were also rejected under 35 USC § 103(a) as being unpatentable over Wang et al. in view of Capote et al. and further in view of Ludwig et al. Applicant respectfully traverses the rejection and requests the Office to consider the following.

The Office Action again invokes Official Notice to supplement what the cited references are admitted to have missing. The Office Action admits that "Wang et al. and Capote et al. fail to disclose the use of a translational gantry in depositing the flux." (Office Action at page 5). Applicant respectfully objects to the taking of official notice, and pursuant to M.P.E.P. § 2144.03, Applicant traverses the assertion of official notice and requests that the Office cite a reference that teaches the missing element. If the Office cannot cite a reference that teaches the missing element, applicant respectfully requests that the Office provide an affidavit that describes how the missing element is present in the prior art. If the Office cannot cite a reference or provide an affidavit, Applicant requests withdrawal of the rejections.

In any event, because Wang does not teach the limitations of claim 30, particularly, because Wang does not form or appreciate the formation of a stress compensation collar while mating a die to a board as required in claim, all the claim limitations are not taught in the cited references. Withdrawal of the rejections is respectfully requested.

Conclusion

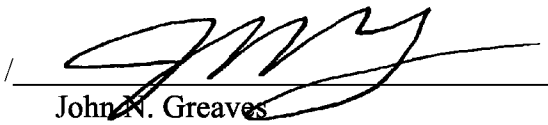
Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney ((801) 278-9171) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

DAEWOONG SUH ET AL.

By their Representatives,
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938
Minneapolis, Minnesota 55402
(801) 278-9171

By /  /
John N. Greaves
Reg. No. 40,362